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On some species of *Trichodina (Ciliata – Peritricha)* of gills of Adriatic fishes

O paru gatunkach *Trichodina (Ciliata-Peritricha)* skrzeli ryb Adriatyku

In autumn 1957, while on the Dalmatian coast, I had the opportunity to collect some material of representatives of the family *Urceolariidae* I am interested in, from molluscs and fishes of the Adriatic. In carrying out this work, I was aided by having facilities extended to me by the Institut za Oceanografiju i Ribarstvo at Split and by the Institut za Biologiju Mora at Rovinj; I am greatly indebted to the management and staff of the two Institutes for offering me room for work on the premises, and for their most friendly assistance.

In the course of several days of work, I was able to investigate, among others, 204 specimens of fishes, representing 29 species, caught near the shores of Split and Rovinj, as well as during the Split Institute's expedition south of Hvar and south of Mljet.

I examined the following fishes: *Selachii* (6 species, 16 specimens), *Merlucius merlucius* (1 specimen), *Siphonostoma typhle* (5), *Pleuronectiformes* (3 species, 7 specimens), *Polyprion cernium* (3), *Serranus scriba* (6), *Sargus annularis* (20), *Coris julis* (5), *Crenilabrus mediterraneus* (5), *C. cinereus* (20), *Uranoscopus scaber* (5), *Smaris vulgaris* (1), *Mullus barbatus* (20), *Blennius ocellaris* (1), *B. tentaculatus* (8), *B. pavo* (3), *Gobius ophiocephalus* (7), *G. cruentatus* (7), *G. jezo* (42), *Scorpaena scrofa* (7), *S. porcus* (4), *Trigla lineata* (10).

I found infection with *Trichodina* merely on the gills of *Mullus barbatus, Blennius ocellaris, B. tentaculatus, B. pavo* and *Gobius ophiocephalus.* They harboured representatives of three *Trichodina* species, two of which were new. I observed the ciliates in question in vivo and in smears fixed with Schaudinn's fluid and stained

subsequently with iron haematoxylin, or in dry silver-nitrate impregnated preparations after Klein. The latter method, which I use since a long time also in investigations concerning *Urceolariidae*, afforded particularly good results and clear pictures.

Anticipating the monograph on *Urceolariidae* I am now preparing, I wish to present in the form of a preliminary report a description of the forms I have come across.

Trichodina domerguei Wallengren forma *jadranica* f. n.

I found representatives of this species in the Adriatic merely on the gills of *Mullus barbatus*, in 5 of the 20 specimens caught near the shores in the vicinity of the Rovinj Institute. The infection was not intensive.

Shape of body typical for the species - pileiform, size: diameter 34 — 43 μ, height 16 — 30 μ. Adoral spiral 24 — 31,5 μ in diameter. Nuclear apparatus: macronucleus sausage-like, irregular in outline, describes an arc of roughly 300° of a radius between 7

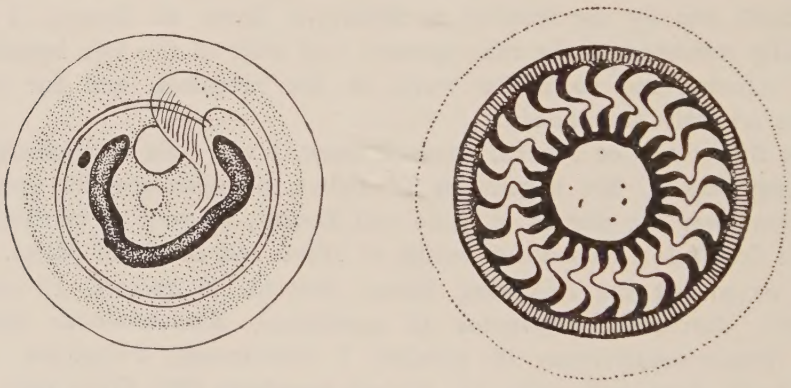

Fig. 1. *Trichodina domerguei* f. *jadranica* f. n.: a — from the oral side, Iron Haem., b — the aboral side, $AgNO_3$.

and 10 μ; micronucleus located close to one of the ends of the macronucleus. The diameter of macronucleus is smaller than that of the adoral spiral. The denticulate ring of the adhesive disk consists of denticles provided with broad, sickle-fashion curved, apically slightly rounded extrorse hooks and sharp introrse spikes (rays) resembling in shape those of other forms of the species. The hooks vary in numbers between 22 and 25. Diameter of the adhesive disk 28 — 38 μ, diameter of the denticulate ring 16 — 22 μ,

length of hooks, counting from the denticle's centre, 3 — 4 μ, length of spikes 2,5 — 3 μ. Number of striae on the periphery of the adhesive disk, corresponding to one denticle of the denticulate ring, is 8. In silver-nitrate impregnated preparations, the centre of the adhesive disk remains bright and sharply outlined against the zone occupied by introrse spikes.

Trichodina domerguei Wallengren forma *jadranica* f. n., is most closely allied to the described by Dogiel, 1940 as *T. domerguei* f. *borealis* pro parte from *Pleuronectes*, and separated by Stryjecka-Trembaczowska, 1953 as *T. domerguei* f. *pleuronectes* on evidence of a population from *Pleuronectes flesus* from the Baltic *.

Fig. 2. *T. domerguei* f. *pleuronectes* Stryj.-Tremb., the aboral side, $AgNO_3$.

Similarity between the two forms is particulary conspicuous when silver-nitrate impregnated preparations are compared. Some differences involve largely a more smooth outline of the nucleus in *T. domerguei* f. *pleuronectes*, and a statistically different distribution of the hooks in the denticulate ring. As a comparison, in addition to a reproduction of a silver impregnated specimen of *T. domerguei* f. *jadranica*, I add also a reproduction of *T. domerguei* f. *pleuronectes* from *Pleuronectes flesus* from the Baltic. The two reproductions, as well as further ones of silver-nitrate impregnated specimens, are absolutely accurate and in no way schematized.

Trichodina rectuncinata sp. n.

Representatives of the species I found on gills of: *Blennius ocellaris*, caugth south of Hvar, *B. tentaculus* from Split and Rovinj (in 5 of 7 specimens), *B. pavo* from Rovinj (in 1 of 3 specimens), and in *Gobius ophiocephalus* from Split (in 1 of 5 specimens); other *Go-*

* Stryjecka-Trembaczowska treated her forms — in agreement with Raabe, 1950 — as belonging to the species *T. pediculus* Ehrbg. My more recent investigations prove that *T. domerguei* is definitely not a synonym of *T. pediculus*, the latter occurring exclusively on hydras.

biidae were free from infection. *T. rectuncinata* sp. n. found on the gills of *Blennius tentaculatus* was invariably attended by *T. ovonucleata* sp. n. Infection was largely rather weak.

Shape of body typical of the genus, cap- or turban-like; the highest and most notably dilated specimens belonged to a population from the gills of *B. ocellaris*. Body diameter, 25 — 50 μ, height, 20 — 40 μ. Diameter of the adoral spiral, 16 — 36 μ. Nuclear apparatus: macronucleus sausage-shaped, describes an arc of roughly 360°of a radius of 9 — 22 μ; micronucleus faces the thinner end of the macronucleus. The diameter of the macronucleus is larger than that of the adoral spiral. The denticulate ring consists of firmly linked denticles provided with long, almost rectilinear, ta-

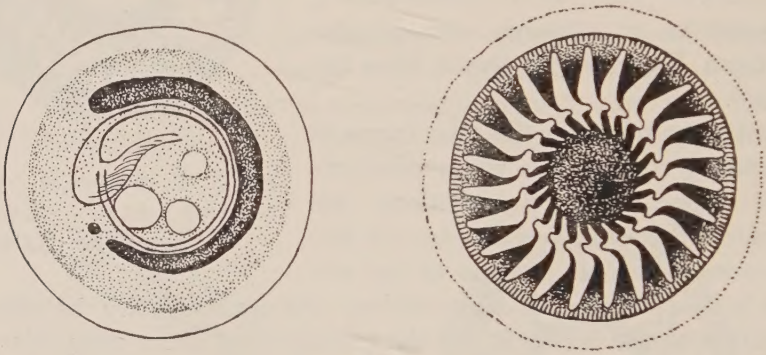

Fig. 3. *Trichodina rectuncinata* sp. n.: a — from the oral side, Iron Haem., b — the aboral side, $AgNO_3$.

pering and blunt extrorse hooks, and relatively short, curbed, introrse spikes (rays). Hooks vary in numbers between 20 and 33, most frequently 22, 23 and 24. Diameter of adhesive disk, 23 — 50 μ, diameter of denticulate ring, 12 — 29 μ, length of hooks, counting from denticle's centre, 5 — 7 μ, length of spikes, 3 — 4.5 μ. Number of striae on the periphery of the adhesive disk varies between 6 and 7 per denticle. The centre of adhesive disk is, in silver impregnated preparations, as dark as the intervals beetwen the spikes.

Trichodina rectuncinata sp. n. differs from all other *Trichodina* species from fishes gills and skin (a total 41 species described!) in structure of skeletal apparatus and, above all, in the characteristic shape of the hooks. In all known species, the latter are curbed sicklefashion and more or less pointed, while the spikes are

straight. Straight hooks, different in shape are, however, found merely in species destitute of introrse spikes, and possessing, apparently without exceptions, an abridged adoral spiral, which makes it possible to include them in the genus *Trichodinella* Šramek-Hušek (= *Brachyspira* Raabe). This character permits of convenient separation of the ciliates in question, and of describing them as a new species.

Trichodina ovonucleata sp. n.

I found representatives of the species merely on gills of *Blennius tentaculatus* from Split and Rovinj (in 5 of 7 specimens investigated), where they occurred together with *T. rectuncinata* sp. n.

Shape of body characteristic of the genus, rather flattened. Diameter of body, 27 — 40 μ, height, 20 — 35 μ. Diameter of adoral spiral, 21 — 35 μ. Nuclear apparatus highly characteristic: macronucleus obovoid or elypsoid, usually 14 × 7—8 μ in size, located excentrically near the cytostomal end of the adoral spiral to-

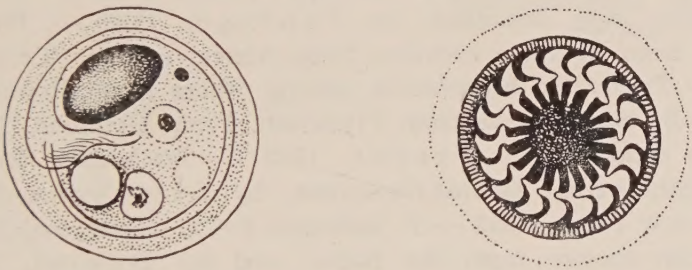

Fig. 4. *Trichodina ovonucleata* sp. n.: a — from the oral side, Iron Haem. b — the aboral side, $AgNO_3$.

gether with the micronucles (3 × 1.5 μ); In pre- or postfission stages, the macronucleus assumes a central position. The denticulate ring consists of loosely connected denticles provided with solid, broad, sicle-shape curved pointed extrorse hooks and relatively weak, slightly curved introrse spikes (rays). The denticles vary little in numbers, viz., between 18 and 21. Diameter of the adhesive disk, 20 — 28.5 μ; diameter of the denticulate ring, 11 — 17 μ, length of hooks, counting from the denticle's centre, ± 3 μ, length of spikes ± 3.5 μ. Number of striae on the periphery of adhesive disk is 7 per 1 denticle. The centre of the adhesive disk is dark in silver-impregnated preparations.

Trichodina ovonucleata sp. n. differs from other *Trichodina* species in macronucleus which is invariably obovoid in shape and compact; from forms allied in respect of denticles structure and belonging to *T. domerguei* Wall., it differs also in the central part of the adhesive disk which, in *T. ovonucleata*, appears dark in silver impregnated preparations. The species is one of the smallest in the genus *Trichodina*. The features referred to make a good characteristic of the ciliates in question and permit of describing them as a new species.

Discussion

Differentiation of *Urceolariidae* of gills and skin of fishes into separate species, as well as into lower systematic units, is related with the geographical and ecological differences in the territory (host's habitat) or with systematic differences between hosts. The Adriatic region has not yet been investigated in respect of occurrence of *Urceolariidae* of gills and skin of fishes and, consequently, there are no opportunities for comparisons. *Trichodina* on gills of *Blenniidae* were described: by Fantham, 1930 — *Trichodina blennii* from *Blennius cornutus* from Africa, and by Tripathi, 1948 — *Trichodina branchicola*, among others from *Blennius pholis* and *B. guttoruginae* from Plymouth. From *Gobiidae*, *Trichodina* was reported: by Precht, 1935 — *Trichodina domerguei*, among others from *Gobius flavescens*, by Stryjecka-Trembaczowska, 1953 — *T. pediculus* (= *T. domerguei*) from the same fish species from the Baltic, and by Dogiel, 1940 — *T. domerguei* f. *meridionalis* from *Mesogobius*. *T. branchicola* Tripathi is undoubtedly a collective unit, comprising forms equivalent to the typical *T. domerguei*, as well as other forms of the species and, possibly, even separate species. However, Tripathi gives a global description, which makes it difficult to decide what forms he was dealing with on the gills of *Blennius*. Precht's data are burdened with the same inadequacy, since they relate to parasites from many fishes. Stryjecka-Trembaczowska was rather dealing with a form allied to *T. domeguei* forma *latispina* Dogiel. Both descriptions of parasites from *Gobius flavescens* appear to suggest that *Trichodina domerguei* occurs on the gills of this species in the Baltic and the North Sea, as also on the gills of *Mesogobius* from the Black Sea. In our case, relevant data could be only those of Fantham, were it not for their

excessive brevity and want of differential analysis and drawings. Fantham writes in his description of *Trichodina blennii* that the populations included forms with nuclei in the shape of „a compact, rounded or ovoid mass", or others, in which the nuclei were „bent and horse-shoe shaped; one end of the horse-shoe may be enlarged", which he is inclined to interpret as manifestations of sexual dimorphism. Fantham — it appears — was dealing, similarly as I was, with two species which possibly corresponded, or were allied, to mine, but he failed to distinguish between them. Consequently, Fantham's description and name seems to refer to an artificial collective unit. Considering that the question cannot be decided, and that general inadequacy of Fantham's diagnoses reduces most of his „species" to the rank of „nomina nuda", I believed to be well advised in describing my two forms from *Blennidae* and *Gobiidae* as new species.

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STRESZCZENIE

Autor zbadał w Splicie i Rovinj (Jugosławia) 204 egz. ryb, należących do 29 gatunków, przeważnie z rzędu *Perciformes*. Na skrzelach paru gatunków ryb stwierdził występowanie przedstawicieli rodzaju *Trichodina*, które opisuje jako nową formę i dwa nowe gatunki, a mianowicie:

Trichodina domerguei forma *jadranica* f. n. ze skrzeli *Mullus barbatus*. Jest to forma zbliżona bardzo do *T. domerguei* f. *borealis* Dogiel, 1940 pro parte dla populacji z *Pleuronectes*, czyli *T. pediculus* (= *T. domerguei*) f. *pleuronectes* Stryjecka-Trembaczowska, 1953 z *Pleuronectes flesus*.

Trichodina rectuncinata sp. n. ze skrzeli *Blennius ocellaris*, *B. tentaculatus*, *B. pavo* i *Gobius ophiocephalus*. Charakterystyczną cechę tego gatunku stanowią długie i proste haki odśrodkowe wieńca szkieletalnego, jakich nie ma żaden inny gatunek rodzaju *Trichodina*, oraz to, że średnica spirali adoralnej jest mniejsza od średnicy makronukleusa.

Trichodina ovonucleata sp. n. ze skrzeli *Blennius tentaculatus*. Gatunek ten charakteryzuje owoidalny makronukleus i sierpowate, ostro zakończone haki wieńca szkieletalnego.